LIST OF CURRENT CLAIMS

1. (Currently Amended) An initialization method for use in a communication system having a plurality of transceivers, wherein the transceivers includes a master transceiver and a slave transceiver coupled to the master transceiver via a channel, each of the transceivers respectively having a noise canceller system, a timing recovery, and a equalizer system, the method comprising:

executing a first stage, wherein the first stage at least comprises the steps of:

transmitting a first idle sequence by the master transceiver;

executing signal detection and channel estimation by the slave transceiver;

determining a plurality of initial coefficients of the equalizer system of the slave transceiver according to the result of channel estimation; and

training the timing recovery in both frequency and phase and the equalizer system of the slave transceiver;

executing a second stage, wherein the second stage at least comprises the steps of:

transmitting a second idle sequence by the slave transceiver;

executing signal detection and channel estimation by the master transceiver;

determining a plurality of initial coefficients of the equalizer system of the master transceiver according to the result of channel estimation; and

training the timing recovery in phase, the equalizer system, and the noise canceller system of the master transceiver while training the noise canceller system of the slave transceiver; and

executing a third stage, wherein the third stage at least comprises the steps of:

training the timing recovery in phase, the equalizer system of the master transceiver while training the timing recovery in both frequency and phase and equalizer system of the slave transceiver,

wherein the channel estimation executed by the slave transceiver comprises:

generating a first frequency response corresponding to a first frequency and a second frequency response corresponding to a second frequency according to the first idle sequence by the master transceiver; and

estimating the channel characteristics according to the first frequency response and the second frequency response; in which the first idle sequence is transmitted at a symbol rate, the first frequency and the second frequency are respectively 1/M and 1/N times of the symbol rate, and M is 2^P times of N, P being a natural number, and

wherein the channel estimation executed by the master transceiver comprises:

generating a third frequency response corresponding to the first frequency and a fourth frequency response corresponding to the second frequency according to the second idle sequence by the slave transceiver; and

estimating the channel characteristics according to the third frequency response and the fourth frequency response; in which the second idle sequence is transmitted at the symbol rate.

2. (Original) The initialization method as claimed in claim 1, wherein the step of signal detection and channel estimation is executed before the step of training by the slave transceiver during the first stage.

3. (Original) The initialization method as claimed in claim 1, wherein the step of signal detection and channel estimation is executed before the step of training by the master transceiver during the second stage.

4. (Original) The initialization method as claimed in claim 1, wherein the step of signal detection in the first stage is for detecting the idle sequence transmitted by the master transceiver and the step of signal detection in the second stage is for detecting the idle sequence transmitted by the slave transceiver.

5. (Original) The initialization method as claimed in claim 1, wherein the noise canceller system of each transceiver includes an echo canceller and a NEXT (Near-End Cross-Talk) canceller.

6. (Original) The initialization method as claimed in claim 1, wherein the equalizer system of each transceiver includes a FFE (Feed Forward Equalizer) and a FBE (Feed Back Equalizer).

7. (Original) The initialization method as claimed in claim 1, wherein the step of channel estimation is for estimating at least one of the channel characteristics.

8. (Original) The initialization method as claimed in claim 7, wherein the at least one of channel characteristics includes channel length.

9. (Original) The initialization method as claimed in claim 7, wherein when the timing recovery of the slave transceiver is trained in both frequency and phase in the first and the third stage, the frequency and the phase of the timing recovery of the slave transceiver are trained separately.

10. (Currently Amended) An initialization method for use in a communication system having a plurality of transceivers, wherein the transceivers includes a first transceiver and a second transceiver coupled to the first transceiver via a channel, each of the transceivers respectively having a noise canceller system, a timing recovery, and a equalizer system, the method comprising:

transmitting an idle sequence by the first transceiver;

executing signal detection and channel estimation by the second transceiver;

determining a plurality of initial coefficients of the equalizer system of the second transceiver according to the result of channel estimation; and

training the timing recovery, the equalizer system, and the noise canceller system of the second transceiver,

wherein the channel estimation comprises:

generating a first frequency response corresponding to a first frequency and a second frequency response corresponding to a second frequency according to the idle sequence by the first transceiver; and

estimating the channel characteristics according to the first frequency response and the second frequency response; in which the idle sequence is transmitted at a symbol rate, the first frequency and the second frequency are respectively 1/M and 1/N times of the symbol rate, and M is 2^P times of N, P being a natural number.

11. (Original) The initialization method as claimed in claim 10, wherein the step of signal detection and channel estimation is executed before the step of training by the second transceiver.

12. (Original) The initialization method as claimed in claim 10, wherein the step of signal detection is for detecting the idle sequence transmitted by the first transceiver.

13. (Original) The initialization method as claimed in claim 10, wherein the noise canceller system of each transceiver includes an echo canceller and a NEXT (Near-End Cross-Talk) canceller.

14. (Original) The initialization method as claimed in claim 10, wherein the equalizer system of each transceiver includes a FFE (Feed Forward Equalizer) and a FBE (Feed Back Equalizer).

15. (Original) The initialization method as claimed in claim 10, wherein the step of channel estimation is for estimating at least one of the channel characteristics.

16. (Original) The initialization method as claimed in claim 15, wherein the at least one of channel characteristics includes channel length.

17. (Original) The initialization method as claimed in claim 10, wherein the timing recovery, the equalizer system, and the noise canceller system of the second transceiver are trained separately.

18. (Original) The initialization method as claimed in claim 10, wherein the equalizer is trained before the noise canceller system and the timing recovery.

19. (Original) The initialization method as claimed in claim 10, wherein when the timing recovery is trained, the frequency and the phase of the timing recovery of the second transceiver are trained separately.

20. (Currently Amended) An initialization method for use in a communication system having at least a transceiver, wherein the transceiver is coupled to other transceiver via a channel, each of the transceivers respectively having a noise canceller system, a timing recovery, and a equalizer system, the method comprising:

executing channel estimation to determine a plurality of initial coefficients of the equalizer system; and

training the timing recovery, the equalizer system, and the noise canceller system of the transceiver separately,

wherein the channel estimation comprises:

generating a third frequency response corresponding to a first frequency and a fourth frequency response corresponding to a second frequency according to an idle sequence transmitted by the transceiver; and

estimating the channel characteristics according to the third frequency response and the fourth frequency response; in which the idle sequence is transmitted

at a symbol rate, the first frequency and the second frequency are respectively 1/M and 1/N times of the symbol rate, and M is 2^P times of N, P being a natural number.

21. (Original) The initialization method as claimed in claim 20, wherein the noise canceller system of the transceiver includes an echo canceller and a NEXT (Near-End Cross-Talk) canceller.

22. (Original) The initialization method as claimed in claim 20, wherein the equalizer system of the transceiver includes a FFE (Feed Forward Equalizer) and a FBE (Feed Back Equalizer).

23. (Original) The initialization method as claimed in claim 20, wherein the step of channel estimation is for estimating channel length.

24. (Original) The initialization method as claimed in claim 20, wherein the equalizer is trained before the noise canceller system and the timing recovery.

25. (Original) The initialization method as claimed in claim 20, wherein when the timing recovery is trained, the frequency and the phase of the timing recovery of the second transceiver are trained separately.